

HILLSBORO RIVER, FLA.

LETTER

FROM

THE SECRETARY OF WAR

TRANSMITTING

A LETTER FROM THE CHIEF OF ENGINEERS, UNITED STATES ARMY, DATED NOVEMBER 7, 1940, SUBMITTING A REPORT, TOGETHER WITH ACCOMPANYING PAPERS AND AN ILLUSTRATION, ON A PRELIMINARY EXAMINATION AND SURVEY OF HILLSBORO RIVER, FLA., FROM THE UPPER END OF THE EXISTING PROJECT TO SULPHUR SPRINGS, AUTHORIZED BY THE RIVER AND HARBOR ACT APPROVED AUGUST 26, 1937

FEBRUARY 21, 1941.—Referred to the Committee on Rivers and Harbors and ordered to be printed with an illustration

WAR DEPARTMENT,
Washington, February 15, 1941.

THE SPEAKER OF THE HOUSE OF REPRESENTATIVES.

DEAR MR. SPEAKER: I am transmitting herewith a report dated November 7, 1940, from the Chief of Engineers, United States Army, on preliminary examination and survey of Hillsboro River, Fla., from the upper end of the existing project to Sulphur Springs, authorized by the River and Harbor Act approved August 26, 1937, together with accompanying papers and illustration.

The Bureau of the Budget has been consulted and advises that authorization of the improvement would not be in accord with the program of the President at this time.

Sincerely yours,

HENRY L. STIMSON,
Secretary of War.

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, November 7, 1940.

Subject: Hillsboro River, Fla.
To: The Secretary of War.

1. I submit for transmission to Congress my report, with accompanying papers and illustration, on preliminary examination and survey of Hillsboro River, Fla., from the upper end of the existing project to Sulphur Springs, authorized by the River and Harbor Act approved August 26, 1937.

2. The Hillsboro River flows into Hillsboro Bay at Tampa, Fla. The controlling depth is 5 feet to the Florida Avenue Bridge at Sulphur Springs, 7.7 miles above the mouth, and decreases to 3.5 feet at the head of navigation, 1.2 miles farther upstream. Widths decrease from 650 feet in the downstream section to 125 feet at Sulphur Springs. The improvement authorized by Congress for Tampa Harbor includes provision of a channel in Hillsboro River 2,400 feet long, 200 feet wide, and 12 feet deep from a turning basin at the mouth to a point 100 feet downstream from the Lafayette Street Bridge. This improvement was completed in 1905 at a cost of \$96,832. The improvement now requested is a channel 10 feet deep with a width of 200 feet from the upper end of the existing project to the Hillsboro Avenue Bridge and of 150 feet thence to the Florida Avenue Bridge at Sulphur Springs. It is claimed that deep-draft vessels require the major portion of the facilities available along the principal water front and that extension of the improved channel in the river is necessary to provide for small craft. No offer of local cooperation is made.

3. Tampa, with a population of 100,000, is an industrial and commercial city. The principal products of the tributary area are phosphate rock, citrus fruits, winter vegetables, timber products, cement, fertilizers, and the manufacture of cigars. Present annual commerce of the river is reported as 300 tons of fish transported in boats drawing up to 9 feet, 48,000 tons of sand and shell transported in 600 round trips of tugs and barges, and 1,800 tons of cedar logs rafted. The total number of craft that used the river in 1938 is reported at 2,595.

4. The district engineer believes that a channel of the dimensions requested is not justified, and that the benefits to navigation would not be greatly increased by this channel. He finds that a channel 9 feet deep and 150 feet wide to a point 2,000 feet upstream from the Michigan Avenue Bridge, thence 80 feet wide to the Florida Avenue Bridge, is economically justified. The estimated initial cost is \$138,000 with \$1,500 annually for maintenance. The estimated initial cost to local interests in altering structures crossing the river, less the enhancement in land value, is \$4,000. The annual carrying charges are estimated at \$7,400 to the United States and \$200 to local interests. Benefits to general navigation are estimated at \$10,750. As the estimated annual savings exceed the annual carrying charges by a substantial margin the district engineer concludes that the improvement is economically justified and he recommends it, subject to certain conditions of local cooperation.

5. The division engineer doubts that increased commerce will develop to such an extent that the additional savings estimated by the district engineer will materialize. He estimates the maximum benefits at not to exceed \$4,135. On this basis he concludes that the

improvement recommended by the district engineer is not economically justified. He believes that a channel 9 feet deep and 100 feet wide to a point 2,000 feet above the Michigan Avenue Bridge and a cleared channel thence to the Florida Avenue Bridge would be reasonably adequate for the needs of general navigation. He estimates the initial cost at \$60,000 with annual maintenance of \$1,000. The annual carrying charges, including maintenance, are estimated at \$3,560. Annual benefits are estimated at \$3,750 in addition to intangible benefits not susceptible of evaluation. The division engineer concludes that improvement to this lesser extent is economically justified and he recommends it, subject to certain conditions of local cooperation.

6. The Board of Engineers for Rivers and Harbors, after careful consideration of the reports of the reporting officers, and after affording local interests full opportunity to be heard, concurs in the view that improvement of the channel to the Michigan Avenue Bridge and clearing thence to the Florida Avenue Bridge is economically justified. The Board recommends the improvement, subject to certain conditions of local cooperation.

7. After due consideration of these reports, I concur in the views and recommendations of the Board. The improvement will produce sufficient general benefits to justify the expenditure. I recommend modification of the existing project for Tampa Harbor to provide in Hillsboro River a channel 9 feet deep and 100 feet wide from the upper end of the existing project to a point 2,000 feet upstream from the Michigan Avenue Bridge, and for removal of snags, wrecks, and piling thence to the Florida Avenue Bridge, at an estimated first cost of \$60,000, with annual maintenance of \$1,000, in addition to that now required, subject to the provisions that local interests furnish, free of cost to the United States, all lands, easements, and rights-of-way and suitable spoil-disposal areas for initial work and subsequent maintenance when and as required; agree to make at their expense necessary alterations to structures crossing the river; and hold and save the United States free from claims for damages resulting from the improvement.

J. L. SCHLEY,
Major General,
Chief of Engineers.

REPORT OF BOARD OF ENGINEERS FOR RIVERS AND HARBORS

[Second endorsement]

THE BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
Washington, D. C., October 1, 1940.

To the CHIEF OF ENGINEERS, UNITED STATES ARMY.

1. Local interests were informed of the conclusions of the division engineer and were invited to submit additional data for the information of the Board. Careful consideration has been given to the communications that were received.

2. The Board concurs in the view that some improvement of Hillsboro River, Fla., is warranted. The channel improvement and clearing proposed by the division engineer will at small cost materially improve the navigability of the waterway. The Board recommends

modification of the existing project for Tampa Harbor, Fla., to provide in Hillsboro River a channel 9 feet deep and 100 feet wide from the upper end of the existing project to a point 2,000 feet upstream from the Michigan Avenue Bridge, and for removal of snags, wrecks, and piling thence to the Florida Avenue Bridge, at an estimated first cost of \$60,000, with annual maintenance of \$1,000, in addition to that now required, subject to the provisions that local interests furnish, free of cost to the United States, all lands, easements, and rights-of-way and suitable spoil-disposal areas for initial work and subsequent maintenance when and as required; agree to make at their expense necessary alterations to structures crossing the river; and hold and save the United States free from claims for damages resulting from the improvement.

For the Board:

THOMAS M. ROBINS,
Brigadier General, Corps of Engineers,
Senior Member.

SURVEY OF HILLSBORO RIVER, FLA.

SYLLABUS

The existing project for Tampa Harbor, Fla., includes a channel in the Hillsboro River, 2,400 feet long, 200 feet wide, and 12 feet deep at mean low water, from the turning basin at the mouth of the river to a point 100 feet downstream from the Lafayette Street Bridge.

Local interests request that the United States provide a channel in Hillsboro River 10 feet deep, at mean low water, 200 feet wide from the upper end of the existing Federal project at least to the Hillsboro Avenue Bridge, and thence 150 feet wide to the Florida Avenue Bridge at Sulphur Springs.

The district engineer finds that the benefits which are likely to result from an improvement are sufficient to justify the provision of an improved channel in the Hillsboro River. An improvement will be of material benefit, not only to navigation but will also reduce flood stages in the river. He therefore recommends that the United States provide a channel with a depth of 9 feet, which is the depth proposed for the Intracoastal Waterway on the west coast, with a width of 150 feet from the upper end of the existing project to a point about 2,000 feet above Michigan Avenue Bridge, thence an 80-foot width to the Florida Avenue Bridge. He further recommends that all obstructions, consisting of wrecks, snags, and old piling be removed in the same reach of the river.

WAR DEPARTMENT,
UNITED STATES ENGINEER OFFICE,
Jacksonville, Fla., March 7, 1940.

Subject: Survey of Hillsboro River, Fla.

To: The Division Engineer, South Atlantic Division, Richmond, Va.

AUTHORITY

1. This report is submitted in compliance with an item in the River and Harbor Act approved August 26, 1937, which provides for a preliminary examination and survey of Hillsboro River, Fla., from the upper end of the existing project to Sulphur Springs. Preliminary reports were submitted by the district engineer on December 10, 1938, and by the division engineer on December 21, 1938. The reports were reviewed by the Board of Engineers for Rivers and Harbors on June 26, 1939, and a survey was ordered to determine a plan of improvement and the cost thereof. The duty of making the survey and

preparing a report thereon was assigned to the district engineer on July 6, 1939.

2. A survey of the area has been made, which includes soundings and probings of the proposed work, and a detailed study of the prospective commerce and economics of the proposed improvement.

DESCRIPTION

3. The Hillsboro River has its source in marshes in the central part of the State of Florida, north of Lakeland in Polk County, and flows thence northwesterly, then in a southwesterly direction, emptying into the northern end of Hillsboro Bay at Tampa, Fla. Its total length is about 65 miles, and its drainage area about 560 square miles.

4. The upper Hillsboro River and tributaries are bordered by wide swamps which are heavily timbered, mostly with cypress and dense undergrowth. Outlying regions of the watershed near the divides shed water from comparatively high ground, but the character of the soil, topography, and forest cover is not conducive to unusually rapid run-off. The Hillsboro River watershed is quadrangular in shape, slightly longer than wide, which results in quick concentration and mounting flood crests toward the mouth of the river, under conditions of general rains over the area.

5. The river below the site of the Tampa Electric Co.'s dam, located about 10.2 miles above the mouth, is the only portion which is considered navigable. Most of this dam washed out during the flood of 1933, but it is still an obstruction to navigation. The scope of this report is limited to that portion of the river extending from the upper limit of the existing Federal project for Tampa Harbor, which is located 100 feet below the Lafayette Street Bridge, to Sulphur Springs, a distance of about 7.8 miles.

6. The maximum discharge, recorded by the United States Geological Survey at their Harney station during June 1934, was 11,750 cubic feet per second. Shortly after failure of the Tampa Electric Co.'s dam, September 1933, discharge at the 40th Street Bridge (above the dam site) was estimated by the United States Geological Survey to be approximately 17,000 cubic feet per second. The minimum discharge of 60 cubic feet per second was recorded on April 5, 1935.

7. Under the project for Tampa Harbor, Fla., the United States has dredged a channel 2,400 feet long, 12 feet deep, and 200 feet wide from the turning basin at the mouth of Hillsboro River to within 100 feet of the Lafayette Street Bridge. From the upper end of the Federal project to the Garcia Avenue Bridge, a distance of about 1.25 miles, depths varying from 8 to 15 feet exist. About 1,000 feet above the Garcia Avenue Bridge there is a shoal in the river extending about 2,200 feet in length to about 800 feet below the Michigan Avenue Bridge. The controlling depth over this bar is about 6 feet. From this bar to the Florida Avenue Bridge, a distance of about 5.3 miles, depths in excess of 9 feet prevail except for two bars, where the controlling depth is about 8.1 feet. One bar is located about 100 feet below Buffalo Avenue, and the other bar, about 50 feet in length, is located about 3,900 feet below Sligh Avenue Bridge. For about 1.3 miles above the Florida Avenue Bridge depths in excess of 9 feet prevail, except at two shoals with a limiting depth of 5.5 feet;

one shoal is located just above the Florida Avenue Bridge, the other is located about 700 feet below the street-railway bridge at Sulphur Springs; thence to the head of navigation at the Tampa Electric Co.'s dam, a distance of about 2 miles, the depths decrease rapidly, with depths of 3.5 feet being found at a number of points, and with a limited depth of 1 foot in the rapids above Sulphur Springs.

8. The banks of the river are generally high; however, during flood stages, the river has overflowed the banks causing considerable damage. The bottom of the river is composed of sand, mud, and clay and is underlain with rock. From the Lafayette Street Bridge to the Michigan Avenue Bridge the width of the river varies from 300 feet to as much as 650 feet; thence to the Hillsboro Avenue Bridge the width is generally from about 200 to 350 feet, with a minimum of about 175 feet. The width decreases from an average of about 200 feet in the vicinity of the Hillsboro Avenue Bridge to about 125 feet at the Florida Avenue Bridge at Sulphur Springs, and thence to about 110 feet near the head of navigation.

9. The river is tidal, the average tidal variation at the mouth being about 1.8 feet, and at the head of navigation about one-half foot. High-water stage usually prevails from July to September, during which season the prevailing depths are usually about 2.5 feet greater than normal. The highest stage is about 4.5 feet above low-water stage. The fall in the water surface from Sulphur Springs to the mouth is about 1.3 feet, which is uniformly distributed. Due to several shoals in the section of the river under consideration, navigation by the larger type of craft is hazardous and in general is practicable only during the late spring, summer, and early fall months under conditions of high tide.

10. The numerous wrecks found in and on the banks of the Hillsboro River are an additional menace to navigation. There are 33 wrecks that will have to be removed properly to clear the river.

11. There are also numerous old piling and snags to be found in the river that are an additional menace to navigation. An inspection of the Hillsboro River reveals that there are approximately 400 logs, snags, and old piling that will have to be removed to properly clear the river of obstructions, excluding wrecks.

12. The general features of the locality are shown on United States Coast and Geodetic Survey Charts Nos. 587 and 1257, and on the map accompanying this report.

13. A depth of 30 feet is available from the Gulf of Mexico through Tampa and Hillsboro Bays to and including a turning basin in Hillsboro Bay at the mouth of Hillsboro River and including the several channels of Tampa Harbor. St. Petersburg Harbor, with an entrance channel 19 feet deep and a basin 21 feet deep, is situated on the west shore of Tampa Bay 21 miles from Tampa. A Federal channel, 8 feet deep, connects Tampa and Boca Ciega Bays south of Point Pinellas; thence leading through Boca Ciega Bay the channel is 7 feet deep to Blind Pass, and thence 5 feet deep to Clearwater Harbor. Sarasota Bay, with a project depth of 7 feet to Sarasota and thence 3 feet through Little Sarasota Bay to Nokomis, connects with the southern extremity of Tampa Bay. The Manatee River flows into the southern end of Tampa Bay. The Federal project for this river provides for a depth of 13 feet from Tampa Bay to McNeills Point, thence 9 feet deep to Rocky Bluff, and thence 4 feet to Mitchellville Bridge.

14. The Intracoastal Waterway along the Atlantic coast has been completed from Boston to Florida Bay, except across the State of New Jersey, with a minimum depth of 7 feet and width of 100 feet. A report is now pending on the section of the Intracoastal Waterway from Jacksonville to Miami, in which consideration will be given to the request of local interests that the project be modified to provide a depth of 12 feet with additional tributary channels and turning basins.

15. The Okeechobee Cross-Florida Waterway through St. Lucie River and Canal, Lake Okeechobee, Caloosahatchee Canal and River, with present project dimensions of 6-foot depth and 80-foot to 150-foot width, connects the Atlantic Ocean and the Intracoastal Waterway on the east coast of Florida with the Gulf of Mexico and the southern end of the proposed Intracoastal Waterway along the west coast of Florida. A report recently submitted by this office recommended a 9-foot depth for the Okeechobee Cross-Florida Waterway.

16. A report recently submitted by the Chief of Engineers and transmitted to Congress by the Secretary of War (H. Doc. No. 371, 76th Cong., 1st sess.) recommends construction of the Intracoastal Waterway from Caloosahatchee River to Anclote River, Fla., to provide a waterway 9 feet in depth and 100 feet in width. The Intracoastal Waterway from Corpus Christi, Tex., to St. Marks River, Fla., is complete with the exception of a few sections.

17. Tampa is connected by several lines of the Atlantic Coast Line Railroad and the Seaboard Air Line Railway with all rail points in the United States. Numerous highways radiate from this point, the principal of which are United States Highways Nos. 41, 92, and 541, and State Highways Nos. 17, 23, 79, 230, 232, and 314.

18. There are two municipal airports, Drew Field and Peter O. Knight Field; a seaplane base is to be constructed at the latter. Tampa is a stopping point for planes of the Eastern Air Lines and the National Air Lines. Construction on the Army air base located on the Interbay Peninsula is expected to commence soon.

TRIBUTARY AREA

19. Trade and commerce of the area is of varied character, consisting principally of manufacturing and shipping, but influenced considerably by mining (phosphate), agriculture, tourists, commercial fishing, and forestry. The principal products of the area are phosphate, portland cement, lumber, citrus fruits, winter vegetables, boats, fertilizers, and cigars. Products brought into the area are petroleum products, manufactured or processed goods not produced in the area, foodstuffs, and raw materials for manufacture.

20. *General area.*—The general area to and from which commerce of the area is moved includes points on the railways and highways leading into the area from the United States, points on the Intracoastal Waterway, Boston to Corpus Christi, and ports of call of oceangoing vessels entering deep-sea harbors of the west coast of Florida. Tourists enter the area, principally over the highways, from all parts of the United States, particularly the Eastern and Central States.

21. *Local area.*—The local area tributary to the proposed improvement includes not only the city of Tampa and the immediate environs of the section of Hillsboro River herein considered, but also the west

coast of Florida. It is considered that with the provision of the Intracoastal Waterway on the west coast of Florida products will move to and from Tampa, which is the only deep-water port on the west coast handling general cargo. For the repair and summer storage of boats, the proposed improvement would be used by owners of boats at Tampa, St. Petersburg, and other points on Hillsboro and Tampa Bays.

22. The incorporated cities included in the area immediately tributary are Tampa, St. Petersburg, and Port Tampa. The permanent population of these cities for the past 20 years, as obtained from the Sixth Census of the State of Florida, are given in table I, which follows.

TABLE I.—*Permanent population*

Location	1915	1920	1925	1930	1935
Tampa.....	48,160	51,608	94,743	101,161	100,151
St. Petersburg.....	7,186	14,237	26,847	40,425	40,856
Port Tampa.....	1,071	1,030	1,253	1,242	1,090

Sulphur Springs, a community on the section of the Hillsboro River herein considered, is not within the city limits of Tampa. The present permanent population of Sulphur Springs is about 3,700.

23. Winter population of cities in the tributary area is considerably greater than the permanent population. This increase is due to the influx of tourists during the winter season. Estimated winter populations are as follows:

Tampa.....	150,000
St. Petersburg.....	200,000
Sulphur Springs.....	6,000
Port Tampa.....	1,500
Total.....	357,500

24. Tampa is primarily an industrial and commercial city. This city has 450 manufacturing establishments, the products of which are valued at \$28,384,810 annually, as reported by the United States Census of Manufactures for 1935 and the Tampa Chamber of Commerce. The principal manufactured products of Tampa are cigars, phosphate, cement, boxes, fertilizers, tin containers, canned grapefruit, and beverages. Over 1,000,000 cigars are produced daily in the factories of Tampa. Approximately three-fourths of the phosphate produced in the United States is mined in Florida and, during 1937, 1,738,526 tons of phosphate moved through Tampa's port.

25. The Southern Lumber & Supply Co. and the Thompson Brice Lumber Co. operate lumber yards in Tampa on the banks of the Hillsboro River. The lumber yard of the Southern Lumber & Supply Co. is located on the east bank of the river, immediately north of the Cass Street Bridge. Water facilities have been utilized by this company to bring in lumber to its plant by barge. However, this method of shipping lumber was discontinued 10 years ago because of the shallow depth of the river.

26. Adjacent to the Hillsboro River there are six marine repair plants, one boiler shop, one foundry welding and repair shop, a commodity-storage warehouse, and equipment warehouses and storage yards of the public utilities of Tampa. The largest of the marine repair plants on the river is that of the Tampa Steam Ways, which has marine ways capable of accommodating vessels up to about 120 feet in length and with drafts of from 8 to 10 feet. This company and the Bay Dredging & Construction Co., which also operates a marine repair plant, handle sand and shell. No mineral products are mined in the immediate area. Sand, gravel, and shell are secured from the surrounding territory.

27. Four commercial fish houses are located along the section of the river under consideration. Only three of these houses operate fishing boats. The total products of these establishments brought in by water were about 300 tons in 1938. A substantial additional amount was brought in by truck from surrounding inlets and waterways.

28. The Hillsboro River and adjacent area in the vicinity of Tampa have ample facilities for health and recreation. There are 2 tourist centers, a municipal trailer camp, and 6 recreational parks bordering the river. The 2 tourist centers are equipped for the entertainment of winter visitors. The municipal trailer camp will accommodate about 1,000 trailers. The recreational parks make the river easily accessible to people who wish to use the river for recreational purposes. One of these parks, at Sulphur Springs, has a swimming pool and other recreational facilities.

29. There are three large yacht basins and a municipal pier at St. Petersburg. This city accommodated about 140 visiting yachts during the 1937-38 and 1938-39 seasons, many of which would be potential customers for marine repair shops and fresh-water-storage accommodations. Customs records indicate that there are 395 and 261 pleasure boats in Tampa and St. Petersburg, respectively.

30. Lack of sufficient quantities of certain agricultural, petroleum, and forestry products, and manufactured and processed goods, require importation from other parts of Florida and the United States.

BRIDGES AND OTHER OBSTRUCTIONS

31. Twelve bridges cross the portion of the river under consideration; the 4 farthest upstream have fixed spans, while all others have movable spans. Since the upper limit of the improvement requested is at the lower of these 4 fixed bridges, no alterations of bridges would be required. Two additional bridges cross the navigable portion of the river—one with bascule span located 0.04 mile above the mouth, and the other, with fixed span, located about 9.78 miles above the mouth. Data pertaining to the 12 bridges crossing the section of the river under consideration herein are given in table II, which follows.

TABLE II.—Bridges

Distance above mouth of river	Location	Owner	Purpose	Type of span	Clearance (feet)			Built under permit
					Horizontal	Mean low water	Mean high water	
<i>Miles</i>								
0.47	Lafayette St.....	City of Tampa.....	Highway..	Bascule..	75.0	16.9	14.9	Yes.
.81	Cass St.....	Atlantic Coast Line R. R. Co.	Railway..	do.....	75.0	8.9	6.9	Yes.
.84	do.....	City of Tampa.....	Highway..	do.....	75.0	15.0	13.0	Yes.
1.12	Fortune St.....	do.....	do.....	do.....	75.0	14.0	12.0	Yes.
1.70	Garcia Ave.....	do.....	do.....	Swing....	50.0	14.9	12.9	Yes.
2.44	Michigan Ave.....	do.....	do.....	do.....	50.0	12.0	10.0	Yes.
4.92	Hillsboro Ave.....	State road department..	do.....	Vertical lift.	60.0	12.0	10.0	Yes.
6.59	Sligh Ave.....	Hillsborough County.....	do.....	Swing....	56.5	7.0	5.0	Yes.
7.71	Florida Ave.....	City of Tampa and State road department.	do.....	Fixed....	38.0	13.0	11.0	Yes.
8.20	Nebraska Ave.....	Tampa Electric Co.....	Street railway.	do.....	109.0	9.8	7.8	Yes.
8.22	do.....	State road department..	Highway..	do.....	40.0	12.0	10.0	Yes.
8.28	Sulphur Springs..	Hillsborough County.....	do.....	do.....	101.5	9.0	7.0	No.

¹ 55.0 when open.

32. Obstructions, other than bridges, which cross that portion of the Hillsboro River under consideration herein are given in the following table:

TABLE III.—Pipe and cable crossings

Distance above mouth of river	Location	Owner	Description	Depth below local mean low water	Built under permit
<i>Miles</i>				<i>Feet</i>	
0.47	North side of bridge at Lafayette St.	Peninsular Telephone Co.	3 submarine cables, telephone.	¹ 12+	Yes.
.81	Polk St.....	Tampa Electric Co.	Submarine cable, electric.	¹ 10.5+	No.
.84	Cass St., north of bridge.	Peninsular Telephone Co.	2 submarine cables, telephone.	¹ 10.5+	Yes.
.84	do.....	Western Union Telegraph Co.	Submarine cable, telegraph.	12.0	Yes.
1.17	Constant to Laurel St.....	Tampa Gas Co.	2 16-inch gas mains, enclosed in concrete.	13.8-15.0	Yes.
1.27	Scott and Roberts Sts.....	Tampa Water Works.	12-inch water main..	¹ 9.3	No.
1.38	Kay and Main Sts.....	do.....	do.....	¹ 12+	No.
1.39	86 feet north Kay St. property line.	do.....	20-inch water main..	12+	Yes.
1.76	North Blvd.....	Tampa Electric Co.	Submarine cable, electric.	9.5	No.
2.44	Michigan Ave. north of bridge.	Tampa Gas Co.	16-inch gas main....	12.8-14.8	Yes.
4.96	300 feet north of Hillsboro Ave. Bridge.	Peninsular Telephone Co.	Submarine cables, telephone.	(¹)	Yes.
6.59	Sligh Ave. Bridge, south side.	Tampa Water Works.	6-inch water main....	¹ 9.0	No.
7.46	Highland Ave.....	Purity Springs Water Co.	do.....	¹ 12+	No.
7.46	do.....	Tampa Electric Co.	Submarine cable, electric.	¹ 12+	No.

¹ On bottom of river.

33. As a result of a survey, it has been determined there are 33 wrecks which will have to be removed properly to clear the river for navigation. Data pertaining to these wrecks will be found in table IV which follows.

TABLE IV.—List of wrecks in Hillsboro River, Fla.

Wreck No.	Description				Location
	Type	Length	Width	Draft	
		<i>Feet</i>	<i>Feet</i>	<i>Feet</i>	
1	Schooner <i>Jean</i>	38	10	5	Approximately 500 feet north of Fortune St. Bridge, east side of river.
2	Open-top barge.....	85	26	7	Approximately 1,800 feet north of Fortune St. Bridge, east side of river.
3	Old dredge hull.....	90	30	4	Do.
4	Closed-deck barge.....	40	16	2.5	Approximately 800 feet east of Garcia Ave. Bridge, north side of river.
5	do.....	85	30	3	Approximately 100 feet east of Garcia Ave. Bridge, north side of river.
6	do.....	60	24	2	Approximately 200 feet south of Michigan Ave. Bridge, west side of river.
7	Motor vessel <i>Badger</i>	51	13	4	Approximately 500 feet north of Michigan Ave. Bridge, east side of river.
8	Motor vessel <i>Sweetheart</i> ...	43	10	5	Approximately 600 feet north of Michigan Ave. Bridge, east side of river.
9	Barge.....	85	30	-----	Approximately 1/4 mile north of Michigan Ave. Bridge, west side of river.
10	do.....	85	30	-----	Do.
11	do.....	85	30	-----	Do.
12	Dredge <i>Clyde</i>	136	38	1 9	Foot of Buffalo Ave., west side of river.
13	Barge.....	45	20	-----	Approximately 100 feet north of Buffalo Ave., east side of river.
14	Derrick barge.....	30	16	-----	Approximately 400 feet north of Buffalo Ave., west side of river.
15	Closed-deck barge.....	75	22	-----	Approximately 500 feet north of Buffalo Ave., west side of river.
16	do.....	75	22	-----	Do.
17	do.....	90	26	1 7	Do.
18	do.....	80	26	1 7	Approximately 600 feet north of Buffalo Ave., west side of river.
19	do.....	90	26	1 7	Do.
20	do.....	106	30	1 7	Approximately 800 feet north of Buffalo Ave., west side of river.
21	Bottom part of barge.....	30	20	-----	Approximately 1,100 feet north of Buffalo Ave., west side of river.
22	Closed-deck barge.....	40	16	1 3.5	Approximately 1,200 feet north of Buffalo Ave., west side of river.
23	do.....	40	16	1 3.5	Do.
24	do.....	40	18	1 3.5	Approximately 1,300 feet north of Buffalo Ave., west side of river.
25	do.....	40	18	1 3.5	Do.
26	do.....	80	30	-----	Approximately 1,500 feet north of Buffalo Ave., west side of river.
27	Wooden pontoon barge....	20	16	-----	Approximately 1,600 feet north of Buffalo Ave., west side of river.
28	Closed-deck barge.....	110	30	-----	Approximately 1,000 feet south of Hillsboro Ave. Bridge, east side of river.
29	do.....	60	20	-----	Approximately 100 feet south of Hillsboro Ave. Bridge, east side of river.
30	Bottom part of barge.....	60	30	-----	Approximately 1,000 feet north of Sligh Ave. Bridge, west side of river.
31	Wooden pontoon.....	12	6	-----	Approximately 1,500 feet west of Florida Ave. Bridge, south side of river.
32	Old schooner or barge....	60	-----	-----	Approximately 800 feet west of Florida Ave. Bridge, north side of river.
33	Old schooner hull.....	45	12	-----	Approximately 600 feet west of Nebraska Ave. Bridge, north side of river.

¹ Depth as indicated is depth of hull.

PRIOR REPORTS

34. Prior preliminary examination and survey reports on the waterway are shown in the following table:

TABLE V.—*Prior reports*

Section covered	Date of report	Where published						Remarks
		Congressional documents				Annual reports, Chief of Engineers		
		House or Senate	Document No.	Congress	Session	Year	Page	
Tampa Bay and the mouth of Hillsboro River.	Aug. 25, 1879	House executive.	82	45	3	1879	870	Favorable to a depth of 9 feet.
Tampa Bay, including Hillsboro River up to the city of Tampa.	Jan. 5, 1887	House-----	58	50	1	1887	1257	Unfavorable to a depth in excess of 9 feet.
Hillsboro Bay from its confluence with Tampa Bay through Hillsboro Bay and River to the city of Tampa.	Jan. 26, 1897	-----do-----	229	54	2	1897	1574	Preliminary examination survey report; basis for existing project in Hillsboro River.
	June 15, 1898	-----do-----	545	55	2	1898	1357	
	Hillsboro River.....	July 2, 1913	-----do-----	¹ 132	63	1	-----	
Hillsboro River between Tampa Electric Co.'s dam and Crystal Springs.	Aug. 4, 1913	-----do-----	¹ 183	63	1	-----	-----	Unfavorable to clearing river of obstructions and deepening to 3 or 4 feet.

¹ Contains maps.

EXISTING PROJECT

35. No Federal project has been adopted for the section of the river considered in this report. The existing project for Tampa Harbor, Fla., includes the provision for a channel in Hillsboro River 2,400 feet long, 200 feet wide, and 12 feet deep, at mean low water, from the turning basin at the mouth of the river to a point 100 feet downstream from the Lafayette Street Bridge. This channel was practically completed in 1905 at a cost of \$96,832.91, which has been included in the expenditures reported under previous projects for Hillsboro Bay.

LOCAL COOPERATION

36. None.

OTHER IMPROVEMENTS

37. S. Felicione & Sons, wholesale fish dealers, have dredged a considerable area adjacent to their wharf and have improved the channel leading therefrom to deep water in the Hillsboro River. Mr. L. H. Lothridge has dredged in front of his property to a depth of about 10 feet at mean low water. Tampa Box Co. dredged approximately 4,000 cubic yards of material from the east bank of river just north of the Hillsboro Avenue Bridge for logging operations. The Tampa

Sand & Shell Co. (now the Bay Dredging & Construction Co.) has dredged an area in front of its property just east of the Garcia Avenue Bridge to approximately 12-foot depth at mean low water. The city of Tampa has spent approximately \$125,000 in constructing accommodations for yachts drawing not more than 10 feet, most of which, however, are not located on the Hillsboro River. These facilities include Marjorie Yacht Basin, constructed at Davis Islands, which has 16 slips and will accommodate approximately 32 yachts, with room for additional slips; a new municipal yacht basin constructed in Hillsboro Bay at the mouth of the river as a part of the Bayshore seawall development, which includes a concrete wharf from which extend 37 slips which are estimated to accommodate from 75 to 80 shallow-draft craft; and 2 marginal wharves constructed on the west side of the Hillsboro River extending the greater part of the distance between Lafayette and Cass Street Bridges adjacent to Plant Park.

TERMINAL AND TRANSFER FACILITIES

38. Terminal facilities at various points along that section of the river under consideration consist of 2 municipal wharves, 2 wharves for petroleum storage yards, 4 fish houses, 3 warehouses, 6 marine repair shops, and in excess of 30 privately owned wharves and piers. The municipal wharves, having a total of 1,000 lineal feet of berthing space, are used primarily for pleasure craft. Rail and highway facilities are available at present to 3 wharves; the remainder have highway connections only. The total available berthing space at all wharves is in excess of 2,700 lineal feet. The terminals are adequate for existing commerce but, should any substantial increase in traffic result, some repairs to existing structures and the construction of additional facilities would probably be required. Adequate space is available for expansion of terminals as may be required.

IMPROVEMENT DESIRED

39. The city of Tampa, with the cooperation of the Tampa Chamber of Commerce, desires the provision of a channel in Hillsboro River 10 feet deep at mean low water, 200 feet wide from the upper end of the existing Federal project, just below the Lafayette Street Bridge, at least to the Hillsboro Avenue Bridge, and thence 150 feet wide to the Florida Avenue Bridge at Sulphur Springs. The desire is to carry the 200-foot width as far upstream as practicable. The total length of the section included in the request is approximately $7\frac{1}{2}$ miles.

40. *Public hearing.*—A public hearing on the improvement requested was held by the district engineer at Tampa, Fla., on January 9, 1940. The hearing was attended by approximately 25 persons, consisting of representatives of the city and county governments, civic organizations, interested business concerns, and private property and boat owners. The provisions of paragraph 577, Orders and Regulations, were complied with.

41. The principal reasons advanced in favor of the proposed improvement are:

(a) That the river, if developed, would afford an important and valuable auxiliary to the activities of the port of Tampa and the entire Tampa Bay area. Due to the activities of this port being confined almost entirely to deep-draft vessels and the fact that the facilities

afforded, or in prospect, are designed to handle the larger and deeper draft craft and require the major portion of the water front in the harbor, opportunity for the accommodation, both for repair and storage, of small craft is now limited.

(b) That it would eliminate the difficulties of navigation and losses now due to frequent groundings by the boats using the river for commercial and pleasure purposes, and by those seeking repairs.

(c) That repairs, reconditioning, and refitting of small commercial and pleasure boats up to about 120 feet in length and 10 feet draft can best be accomplished at one or more of the six marine repair plants located on the Hillsboro River. Under existing conditions the larger types of craft can navigate the river only under the most favorable tide, and the business of these repair plants handling the larger types of craft is limited.

(d) That it would result in a saving to the owners of commercial and pleasure craft seeking repairs who, because of shoal conditions in the Hillsboro River, are now forced to go long distances to find facilities where such repairs can be effected. Visiting yacht owners who desire reconditioning and other work on their craft usually await the return to their home ports rather than take the chance of navigating the Hillsboro River. The majority of this business is now lost to the city of Tampa.

(e) That the Hillsboro River is the outstanding fresh-water stream flowing into the salt-water bodies along this section of the west coast of Florida.

(f) That it would result in savings in transportation costs.

(g) That the channel improvement would result in improved flow conditions, consequently reducing flood damage.

COMMERCE

42. It is not practical to determine accurately the volume of commerce on the Hillsboro River for recent years, as it is included as a part of Tampa Harbor commerce in the Annual Report of the Chief of Engineers. Available information indicates no appreciable change in the volume of commerce on the river in recent years. It is believed that commerce on the river is limited due to existing shoals, and also to the fact that there are no channel markers in the river; this is substantiated by statements of navigation interests. (See appendix "A.") Without aids to navigation the river is at times dangerous to navigate with boats drawing more than 5 feet.

43. The major items of the present water-borne commerce, on that section of the river under consideration, include the annual movement of about 300 tons of fish valued at \$36,000; 48,000 tons of sand and shell valued at \$48,000; and 1,800 tons of cedar logs valued at \$30,000. Fish are caught in the Gulf of Mexico, surrounding bays and inlets, and are delivered to the fish houses on the Hillsboro River; boats used to catch these fish draw up to 9 feet of water; deeper-draft vessels use only lower section of river below Lafayette Street Bridge. Sand and shell are secured in the vicinity of Tampa, and are barged to storage yards on the river, requiring an annual movement of about 600 round trips by tugs and barges. Cedar logs are unloaded from boats in Tampa Harbor and rafted up the Hillsboro River to a point just north of the Hillsboro Avenue Bridge. As a result of the pro-

¹ Not printed.

posed improvement, it is believed that introduction of heavier equipment will follow with increased loadings and additional savings to present water-borne movement of sand and shell, estimated at 20 percent, amounting to \$1,920.

44. *Marine ways.*—There are six principal marine repair plants, one boiler ship, one foundry, welding, and repair shop operating along that section of the river under consideration herein. Letters from operators of three of the largest plants indicate their total gross income for 1938 to be about \$46,900. (See appendix A.¹) The gross income as shown above is believed to be conservative, as the stated gross income for the Bay Dredging & Construction Co. alone for 1936 was reported to be \$100,000. It is estimated that the average annual gross income for all plants amounts to a total of about \$60,000; operators believe their business will be increased about 40 percent if the desired improvement is provided. Local interests in St. Petersburg alone state that of the 73 pleasure boats which visited that city during the 1938-39 season only 52 could navigate the river with safety. It is estimated that, with the provision of the desired improvement, about 100 additional boats, drawing from 5 to 9 feet, will enter the Hillsboro River for repairs and storage. For boats of this type the annual cost for storage and repairs will be about \$250 for each boat. That this business would increase is evidenced by the fact that owners of marine repair and storage facilities have lost considerable business because of the hazards of navigation in the river.

45. *Sand and shell.*—The sand and shell business for 1938, as obtained from the Annual Report of the Chief of Engineers, amounted to 42,608 tons of shell and 5,400 tons of sand, and was divided between the Bay Dredging & Construction Co. and the Tampa Steam Ways (Robert M. Brown). The Bay Dredging & Construction Co. states that the proposed improvement would enable them to increase sales of sand and shell because they could deliver the material at points along the river upstream. They believe the increase would be about 5,000 tons per annum. Mr. Brown (Tampa Steam Ways) stated that the amount of shell placed on the barges, which is towed to their stock piles for storage, must be restricted in order to pass shoals now existing in the river downstream. As the Bay Dredging & Construction Co. is located upstream from the Tampa Steam Ways it likewise experiences difficulty. From the foregoing facts it is estimated that the annual movement of sand and shell will be increased by about 8,000 tons annually.

46. *Brengle Bros.*, in the building-material business and manufacturers of cement products, own a tract of land on the bank of the Hillsboro River near the Sligh Avenue Bridge. They state that they formerly had a material dump along the banks of the river which had to be abandoned as delivery of material by water was too hazardous. Furthermore, they state that, if the project is provided, they contemplate using a part of their tract as a sand and shell dump.

47. *Lumber.*—The Southern Lumber & Supply Co. is located on the east bank of the Hillsboro River just north of the Cass Street Bridge. At one time this company transported by water the major portion of their supply of lumber, but due to the shoal conditions of the Hillsboro River this practice was discontinued. It is believed by the officials of this company, that with the provision of an adequate channel, they would use water facilities to transport about

¹ Not printed.

1,000,000 board feet, or 2,000 tons of lumber annually from Tampa Harbor to the lumber yard on the Hillsboro River. The present rail rate from the Tampa water front to the lumber yard is \$7.92 per average car of 17 tons, or \$0.46 per ton. It is estimated by operators of tugboats and barges that lumber can be barged from the Tampa water front up the Hillsboro River to the lumber-yard of the Southern Lumber & Supply Co. for about \$0.15 per ton. The cost of extra handling will amount to about \$0.10 per ton. As a result of the provision of the desired improvement, there will be a saving of about \$0.22 per ton, or an annual saving of \$440 in the transportation of lumber.

48. Thompson Brice Lumber Co. receives shipments of lumber from Mobile and other ports which are discharged at various wharves in Tampa Harbor, some of which are located on Seddon Island, where truck transportation is not possible at the present time; therefore the company would doubtless find it profitable and convenient to transport lumber by barge from the lumber wharves to its yards.

49. *Petroleum.*—The Gulf Oil Corporation and the Standard Oil Co. have petroleum-storage depots on the Hillsboro River. Both of these companies maintain deep-water terminals in Tampa Harbor at Port Tampa, where their products are received from oceangoing tankers. At the present time both companies are stocking their riverside depots by rail at a cost of \$7.92 per capacity tank car of 42 tons, or \$0.19 per ton, from Port Tampa to the Hillsboro River depots. The Gulf Oil Corporation now operates a shallow-draft tanker *Gulf Spray* to distribute petroleum products from its Port Tampa terminal to various coastal points between Pensacola and Key West. Officials of the Gulf Oil Corporation have stated that this tanker, with a loaded draft of 9 feet, would be used to transport about 9,250 tons of petroleum products annually from the Port Tampa terminal to the Hillsboro River depot if the desired improvement is provided. Since the *Gulf Spray* is idle part of the time at Port Tampa, the superintendent of the Gulf Oil Corporation's Port Tampa terminal states that the only additional cost there, in using the *Gulf Spray* for transporting petroleum products to their river depot, would be the cost of fuel and \$0.005 per barrel wharfage charge. The fuel used per 330-ton load would cost about \$5 and the wharfage charge per ton would be about \$0.035. It is estimated, therefore, that there would be a saving of \$0.14 per ton, or an annual saving of about \$1,300 in the transportation of petroleum if the desired improvement is provided.

50. *Commercial fishing.*—It is not believed that the improvement of the Hillsboro River will materially increase the production of fish, but the damage to fishing boats due to grounding will be eliminated by the improvement. Boats used for fishing draw up to 9 feet and have considerable difficulty navigating the Hillsboro River; the deeper draft vessels only use the river below Lafayette Street Bridge. Conditions are such that considerable time is lost waiting for favorable tides. Boats are sometimes run aground and, at various times, fishing boats have to be unloaded near the mouth of the river and the fish have to be transported by truck to the fish houses on the river. It is estimated that the expense due to lost time, trucking, and damage to boats that run aground amounts to about \$1,200 annually.

51. *Health and recreational activities.*—It is estimated that there are, at present, about 100 privately owned pleasure boats kept on the

section of the river considered herein. The operating costs amount to about \$250 annually for each boat. The Tampa Yacht Club stated that it would like to use the river for cruises and also storage of craft during storms. It is believed that about 40 additional pleasure boats will be put on the river as a result of the provision of the desired improvement.

VESSEL TRAFFIC

52. Data of the Tampa office of the Florida Customs District indicate that there are about 5,564 registered craft owned and in active operation along the Florida Gulf coast, most of them between Cedar Keys and Key West. In addition to the locally owned craft, large numbers of pleasure craft from various parts of the Nation visit adjacent waters during the late fall, winter, spring, and early summer seasons. The following table indicates the usage of nearby Federal-project waterways by pleasure craft during the years 1934 to 1937, inclusive, as recorded in part 2 of the Annual Report of the Chief of Engineers:

TABLE VI.—Round trips by pleasure craft and number of passengers carried

Project	1934		1935		1936		1937	
	Trips	Passengers	Trips	Passengers	Trips	Passengers	Trips	Passengers
Sarasota Bay.....	2,415	3,170	12,162	4,860	10,562	3,125	11,995	4,000
Manatee River.....	855	3,540	1,842	3,268	2,850	2,975	2,691	2,875
Tampa Harbor.....			604	224	380	131	539	115
St. Petersburg Harbor.....	5,199	35,000	4,002	12,216	3,852	11,595	2,248	9,144
Channel from Clearwater Harbor through Boca Ciega Bay to Tampa Bay.....	3,809	5,185	4,954	3,650	7,710	3,900	7,911	1,750

The data in the above table are incomplete and estimated in part, and consist largely of trips by local boats, as it is impracticable to segregate trips by visiting craft. While the table does not indicate an extensive use of Tampa Harbor by pleasure craft, any improvement of Hillsboro River would unquestionably be followed by its increased use by local and visiting pleasure boats.

53. The Atlantic Coast Line Railroad bridge at Cass Street has the least vertical clearance of any bridge near the mouth of the river. The following table gives the number and types of vessels passing under this bridge for which the draw was opened during the calendar year 1938:

TABLE VII.—Craft requiring open draw during 1938

Month	Commercial	Pleasure	United States	Total
January.....	155	67	0	222
February.....	111	50	2	163
March.....	179	114	0	293
April.....	86	89	2	177
May.....	107	148	0	255
June.....	111	103	0	214
July.....	112	127	0	239
August.....	429	70	2	201
September.....	115	84	2	201
October.....	115	87	0	202
November.....	134	54	1	189
December.....	125	105	9	239
Total.....	1,479	1,098	18	2,595

ECONOMIC BENEFITS

54. Estimates of the present and additional monetary benefits, which may be expected from the improvement herein recommended, are summarized as follows:

	Monetary benefits	
	Present	Prospective
(a) Freight traffic:		
(1) Total tons per annum, 50,000; total savings in cost per ton, \$0.20; total estimated savings (see par. 43).....	\$10,020	-----
(2) Total estimated savings per ton on 48,000 tons of present traffic, \$0.04; total estimated savings (see par. 43).....		\$1,920
(3) Total estimated additional tons per annum, 25,250; total savings in cost per ton, \$0.1677; total estimated savings (see par. 54).....		4,235
(b) Marine ways:		
(1) Gross income, \$60,000; total estimated present annual benefits (estimated net income) (see par. 44).....	6,000	-----
(2) Gross income, \$24,000; total estimated additional annual benefits (estimated net income) (see par. 44).....		2,400
(c) Commercial fishing: Total present catch in pounds, 600,000; value, \$36,000; total estimated savings due to elimination of lost time and damage due to grounding of boats (see par. 50).....		1,200
(d) Health and recreational activities: Privately operated boats (including yachts and other private boats):		
(1) Total cost of operation per annum, \$25,000; net benefits per annum (estimated).....	2,500	-----
(2) Total cost of operation per annum, \$10,000; net benefits per annum (estimated).....		1,000
(e) Total of present annual benefits.....	18,520	
(f) Total of additional benefits.....		10,755

In addition to the net benefits, commercial fishing conserves for the United States \$36,000 per annum, and health and recreational activities provide benefits to people, who come to Florida from all parts of the United States, which they consider worth \$25,000 per annum; and, in addition thereto, these industries furnish a living to people employed therein amounting to about 75 persons.

55. Details of additional freight and the savings thereon are as follows:

(a) Sand and shell: Additional quantity of 8,000 tons at a saving of \$0.20 per ton (see par. 45 hereinbefore); total saving.....	\$1,600
(b) Lumber: Additional quantity of 2,000 tons at a saving of \$0.22 per ton (see par. 47 hereinbefore); total saving.....	440
(c) Petroleum: Additional quantity of 9,250 tons at a saving of \$0.14 per ton (see par. 49 hereinbefore); total saving.....	1,295
(d) Miscellaneous (from west coast Intracoastal Waterway); ¹ additional quantity of 6,000 tons at a saving of.....	900
(e) Total saving.....	4,235

¹ It is estimated that 6,000 tons of the total traffic of 253,600 tons shown as in-bound and out-bound from Tampa (report on Intracoastal Waterway from Caloosahatchee River to Withlacoochee River, Fla., H. Doc. No. 371, 76th Cong., 1st sess.) over the proposed west coast Intracoastal Waterway will utilize the Hillsboro River. The savings therefore will be the difference between the present truck rates and local water rates plus estimated cost of an extra handling from the upper end of the existing project to points upstream, an average distance of about 1 mile. The estimated average saving per ton is \$0.15.

SURVEY

56. The results of the survey are shown on the map in 38 sheets, only sheet 1 of which accompanies this report. Sheets 2 through 20 show soundings over area in question, and sheets 21 through 38 show the results of probings. The materials encountered were sand, moderately hard limestone rock, and a small amount of clay.

PLAN OF IMPROVEMENT

57. The following alternative plans of improvement, with estimates of quantities and costs for each, are submitted for consideration. In all estimates, side slopes of one vertical on three horizontal were used where conditions permitted and slopes of one vertical on one horizontal used where steep banks existed; an overdepth allowance of 1 foot throughout has been included.

Plan A (for providing a channel 10 feet deep and 200 feet wide from the upper end of the existing project to the Hillsboro Ave. Bridge, thence 150 feet wide to the Florida Ave. Bridge at Sulphur Springs, a total length of about 39,000 feet):

500,000 cubic yards soft material, at \$0.20 per yard.....	\$100, 000
225,000 cubic yards rock, at \$2 per yard.....	450, 000
Engineering and contingencies, approximately 15 percent.....	82, 500
Total.....	<u>632, 500</u>

Plan B (for providing a channel 9 feet deep and 200 feet wide from the upper end of the existing project to a point 2,000 feet upstream from the Michigan Ave. Bridge (Columbus Dr.), thence 80 feet wide to the Florida Ave. Bridge at Sulphur Springs, a total length of about 39,000 feet):

187,000 cubic yards soft material, at \$0.20 per yard.....	\$37, 400
33,500 cubic yards rock, at \$2.50 per yard.....	83, 750
Engineering and contingencies, approximately 15 percent.....	18, 150
Total.....	<u>139, 300</u>

Plan C (same as plan B, except that the channel of 200-foot width be changed to a channel of 150-foot width):

120,000 cubic yards soft material, at \$0.20 per yard.....	24, 000
27,000 cubic yards rock, at \$2.75 per yard.....	74, 250
Engineering and contingencies, approximately 15 percent.....	14, 750
Total.....	<u>113, 000</u>

Plan D (same as plan B, except that the channel of 200-foot width be changed to a channel of 100-foot width):

76,500 cubic yards soft material, at \$0.20 per yard.....	15, 300
22,250 cubic yards rock, at \$3 per yard.....	66, 750
Engineering and contingencies, approximately 15 percent.....	12, 350
Total.....	<u>94, 400</u>

Plan E (for providing a channel 9 feet deep and 150 feet wide from the upper end of the existing project to a point 2,000 feet upstream from the Michigan Ave. Bridge (Columbus Dr.):

100,000 cubic yards soft material, at \$0.20 per yard.....	20, 000
9,000 cubic yards rock, at \$3 per yard.....	27, 000
Engineering and contingencies, approximately 15 percent.....	7, 100
Total.....	<u>54, 100</u>

58. The removal of wrecks, snags, and old piling from the river, at an estimated cost of \$20,000, is regarded as necessary, if any one of the foregoing plans of improvement is provided. If a channel of 10-foot depth is provided, four submarine cables and two water mains will require lowering at an estimated cost of \$40,000. With the provision of a channel of 9-foot depth, the 12-inch water pipe crossing the river at Scott and Roberts Streets, about 1.27 miles above the mouth of the river, will require lowering to a depth of about 14 feet below mean low water, at a cost of about \$10,000. It is believed that alterations of other structures on the river will not be necessary.

59. The estimated carrying charges on the plans proposed are estimated as follows:

PLAN A

(a) Federal investment:	
(1) Estimated expenditure by Engineer Department for new work	\$632, 500
(2) Estimated expenditure for aids to navigation	5, 000
(3) Removal of wrecks, snags, and old piling	20, 000
(4) Total Federal investment	657, 500
(b) Federal annual carrying charges:	
(1) Interest, at $3\frac{1}{2}$ percent, on item (a) (4)	23, 013
(2) Amortization of obsolescence, 50-year life, at $3\frac{1}{2}$ percent, 0.00763 percent of item (a) (4)	5, 017
(3) Annual maintenance	1, 500
(4) Total Federal annual carrying charges	29, 530
(c) Non-Federal investment:	
(1) Alterations of structures crossing the river	40, 000
(2) Less enhancement of value of land used for spoil areas	—6, 000
(3) Total non-Federal investment	34, 000
(d) Non-Federal annual carrying charges:	
(1) Interest, at $4\frac{1}{2}$ percent, on item (c) (3)	1, 530
(2) Total non-Federal annual carrying charges	1, 530
(e) Total Federal and non-Federal annual carrying charges, items (b) (4) plus (d) (2)	31, 060

PLAN B

(a) Federal investment:	
(1) Estimated expenditure by Engineer Department for new work	\$139, 300
(2) Estimated expenditure for aids to navigation	5, 000
(3) Removal of wrecks, snags, and old piling	20, 000
(4) Total Federal investment	164, 300
(b) Federal annual carrying charges:	
(1) Interest, at $3\frac{1}{2}$ percent, on item (a) (4)	5, 750
(2) Amortization of obsolescence, 50-year life, at $3\frac{1}{2}$ percent, 0.00763 percent of item (a) (4)	1, 254
(3) Annual maintenance	1, 500
(4) Total Federal annual carrying charges	8, 504
(c) Non-Federal investment:	
(1) Alteration of structure (water main) crossing the river	10, 000
(2) Less enhancement of value of land used for spoil areas	—6, 000
(3) Total non-Federal investment	4, 000
(d) Non-Federal annual carrying charges:	
(1) Interest, at $4\frac{1}{2}$ percent, on item (c) (3)	180
(2) Total non-Federal annual carrying charges	180
(e) Total Federal and non-Federal annual carrying charges, items (b) (4) plus (d) (2)	8, 684

PLAN C

(a) Federal investment:	
(1) Estimated expenditure by Engineer Department for new work	\$113, 000
(2) Estimated expenditure for aids to navigation	5, 000
(3) Removal of wrecks, snags, and old piling	20, 000
(4) Total Federal investment	138, 000

PLAN C—continued

(b) Federal annual carrying charges:	
(1) Interest, at 3½ percent, on item (a) (4)-----	\$4, 830
(2) Amortization of obsolescence, 50-year life, at 3½ percent, 0.00763 percent of item (a) (4)-----	1, 053
(3) Annual maintenance-----	1, 500
(4) Total Federal annual carrying charges-----	7, 383
(c) Non-Federal investment: Same as for plan B-----	4, 000
(d) Non-Federal annual carrying charges: Same as for plan B-----	180
(e) Total Federal and non-Federal annual carrying charges, items (b) (4) plus (d)-----	7, 563

PLAN D

(a) Federal investment:	
(1) Estimated expenditure by Engineer Department for new work-----	\$94, 400
(2) Estimated expenditure for aids to navigation-----	5, 000
(3) Removal of wrecks, snags, and old piling-----	20, 000
(4) Total Federal investment-----	119, 400
(b) Federal annual carrying charges:	
(1) Interest, at 3½ percent, on item (a) (4)-----	4, 179
(2) Amortization of obsolescence, 50-year life, at 3½ percent, 0.00763 percent of item (a) (4)-----	911
(3) Annual maintenance-----	1, 500
(4) Total Federal annual carrying charges-----	6, 590
(c) Non-Federal investment: Same as for plan B-----	4, 000
(d) Non-Federal annual carrying charges: Same as plan B-----	180
(e) Total Federal and non-Federal annual carrying charges, items (b) (4) plus (d)-----	6, 770

PLAN E

(a) Federal investment:	
(1) Estimated expenditure by Engineer Department for new work-----	\$54, 100
(2) Estimated expenditure for aids to navigation-----	4, 000
(3) Removal of wrecks, snags, and old piling-----	20, 000
(4) Total Federal investment-----	78, 100
(b) Federal annual carrying charges:	
(1) Interest, at 3½ percent, on item (a) (4)-----	2, 734
(2) Amortization of obsolescence, 50-year life at 3½ percent, 0.00763 percent of item (a) (4)-----	596
(3) Annual maintenance-----	1, 500
(4) Total Federal annual carrying charges-----	4, 830
(c) Non-Federal investment:	
(1) Alteration of structure (water main) crossing the river-----	10, 000
(2) Less enhancement of value of land used for spoil areas-----	-4, 000
(3) Total non-Federal investment-----	6, 000
(d) Non-Federal annual carrying charges:	
(1) Interest, at 4½ percent, on item (c) (3)-----	270
(2) Total non-Federal annual carrying charges-----	270
(e) Total Federal and non-Federal annual carrying charges, items (b) (4) plus (d) (2)-----	5, 100

WATER POWER AND SHORE LINE CHANGES

60. It is not believed economically practicable to combine this project with water-power development. It is believed that the proposed development will not affect the shore line, as no adverse effect

has resulted from the construction of existing projects at the mouth of the river.

OTHER SPECIAL SUBJECTS

61. It is believed that this project could be combined with that of flood control and thus reduce the cost of flood control to the Federal Government. The feature of flood control is taken up in a separate report now being prepared by the district engineer. The improved channel resulting from the provision of a navigation project would increase somewhat the cross section and the flow, thus lowering the flood crests.

DISCUSSION AND CONCLUSIONS

62. The relationship of Hillsboro River to Tampa Harbor is similar to that of Miami River to Miami Harbor. Each of these rivers flow through industrial portions of the port cities. Miami River flowing through downtown Miami into Biscayne Bay has a project depth of 15 feet at high water; it is an important shallow-draft auxiliary to the deep-water facilities and an important terminus for the east coast Intracoastal Waterway. On this river are located the terminals used by shallow-draft motor vessels, tugs, and barges which ply the Intracoastal Waterway both north and south of Miami, the plants of several dredging companies, yards for the storage of rock and sand produced nearby, and repair plants for the repair and reconditioning of shallow-draft craft. In 1938 the total commerce of the Miami River, exclusive of Dinner Key Seaplane Base in Biscayne Bay, amounted to 434,494 tons valued at \$3,135,109; pleasure boats made 7,066 round trips, carrying 43,134 passengers. By analogy with Miami River it seems probable that Hillsboro River may be expected to become a valuable auxiliary to Tampa Harbor, if adequate channel dimensions be provided.

63. The request for improvement of Hillsboro River is supported by data presented by local interests and have been discussed in the body of this report. Such data as could be verified were used as a basis for the estimation of benefits to be expected as a result of the provision of the desired improvement. In addition to the foregoing an estimate of additional benefits which would likely result from use of the river as a terminus of barge and freightboat traffic along the proposed west-coast Intracoastal Waterway are included. It is believed that provision of the improvement will result in greater economic benefits than are shown in the report, because of the fact that the river will then afford an important auxiliary to the activities of Tampa Harbor as well as the principal point on the west-coast Intracoastal Waterway. No allowance has been made for the growth of commerce due to increased population, and for the increase in number of pleasure boats which will visit this section of the coast if and when the Intracoastal Waterway from Caloosahatchee to Anclote River be provided.

64. Results of the survey show that a channel of the dimensions desired by local interests is not justifiable at the present time from the standpoint of navigation, but that a channel of less depth and width, however, is justified. It is believed that the estimated annual economic benefits to navigation would not be greatly increased if a channel of the dimensions requested by local interests were provided. The most logical plan of improvement which is justifiable at the present time includes the provision of a channel 9 feet in depth, with

a width of 150 feet from the upper end of the existing project to a point about 2,000 feet north of the Michigan Avenue Bridge, a distance of about 10,000 feet, thence 80 feet in width to the Florida Avenue Bridge, a distance of about 29,000 feet, a total distance of about 39,000 feet.

65. The removal of the wrecks, snags, and old piling, as indicated in paragraphs 32 and 33 hereinbefore, is considered necessary both from a standpoint of navigation and future flood control. Although a number of the wrecks and snags are outside the limits of the channel, it is quite likely that floodwaters will move these wrecks possibly into the channel or into bridges. The wrecks and snags, together with the lack of channel markers, constitute the principal subjects of complaint of navigation interests operating above the River Heights boat yard.

66. With the provision of the foregoing plan of improvement, it is believed that only one structure crossing the river will require alteration. A 12-inch water main laid across the bottom of the river at Scott and Roberts Streets will require lowering.

67. Provision of the improvement would result in largely eliminating the damages occasioned by the frequent groundings of boats using the river for commercial and pleasure purposes and of those seeking repairs. The channel would foster resumption of operation of small motor freight boats between Tampa and towns within the Tampa trade area, formerly tried and discontinued because of inadequate depths in the protected waterways along the coast but likely to be resumed if and when the Intracoastal Waterway from Caloosahatchee to Anclote River is provided. Furthermore, the improvement would provide safe navigation for commercial craft and yachts to suitable points for storage where the ravages of the teredo are eliminated.

68. The district engineer concludes that the provision of a channel as outlined in plan C is justified and that the benefits which are likely to accrue therefrom will greatly exceed the annual charges.

RECOMMENDATION

69. The district engineer recommends that the United States provide a channel in the Hillsboro River with a depth of 9 feet at mean low water from the upper end of the existing project, with a width of 150 feet to a point about 2,000 feet upstream from the Michigan Avenue Bridge, thence with a width of 80 feet to the Florida Avenue Bridge, a total distance of about $7\frac{1}{2}$ miles; and that all obstructions, consisting of wrecks, snags, and old piling, be removed in the same reach of the river, at an estimated first cost of \$138,000, with annual maintenance of \$1,500, subject to the provisions that local interests furnish, free of cost to the United States, as and when required, all lands, easements, and rights-of-way and suitable spoil-disposal areas for the initial work and for the subsequent maintenance; agree to make all alterations to structures crossing the river which may be deemed necessary by the United States; hold and save the United States free from claims for damages resulting from the improvement.

LEWIS H. WATKINS,
Colonel, Corps of Engineers,
District Engineer.

[First endorsement]

OFFICE, DIVISION ENGINEER,
SOUTH ATLANTIC DIVISION,
Richmond, Va., April 9, 1940.

To the CHIEF OF ENGINEERS, UNITED STATES ARMY:

1. The benefits to navigation estimated by the district engineer are considered excessive.

2. It is believed that the market to be found for sand and shell in the short distance between the Florida Avenue Bridge and the plants of the two companies handling these commodities is not sufficient to result in the movement of 8,000 additional tons by water and that movement will largely continue to be by land. Two thousand tons is considered a reasonable estimate. The saving on these items should be reduced to \$400.

3. No material increase in miscellaneous commerce is expected to result from the improvement. Existing commerce is confined to sand, shell, and fish and the existing waterway is not utilized to its full capacity. The 6,000 tons of miscellaneous commerce from the west-coast Intracoastal Waterway and the estimated savings therefrom should be eliminated.

4. Of 141 pleasure boats listed by the city of St. Petersburg as visiting the port in 1937-38, only 23, or about 16 percent, were of such drafts that they could not use the existing waterway but could use the proposed waterway. All but 3 or 4 of them could reach 2 of the repair yards with existing depths. Yards farther upstream might be benefited by a deeper channel but their gain would be a loss to the yards on deeper water. No benefit should be credited to boat-repair yards.

5. Of the three fish companies which would benefit by the improvement, two, which operate boats of from 5- to 9-foot draft, now have a controlling depth of 8 feet at mean low water, and one, which operates boats of 6-foot draft, has a controlling depth of 5.1 feet at mean low water. It is not believed that losses due to delays and groundings at low tide will exceed \$500.

6. The district engineer's estimate of an annual benefit of \$440 on lumber should be omitted as the small amount involved could be handled on the existing 8-foot channel.

7. The benefits to be derived from the operation of additional pleasure boats are not susceptible of monetary evaluation and should be classed as intangible.

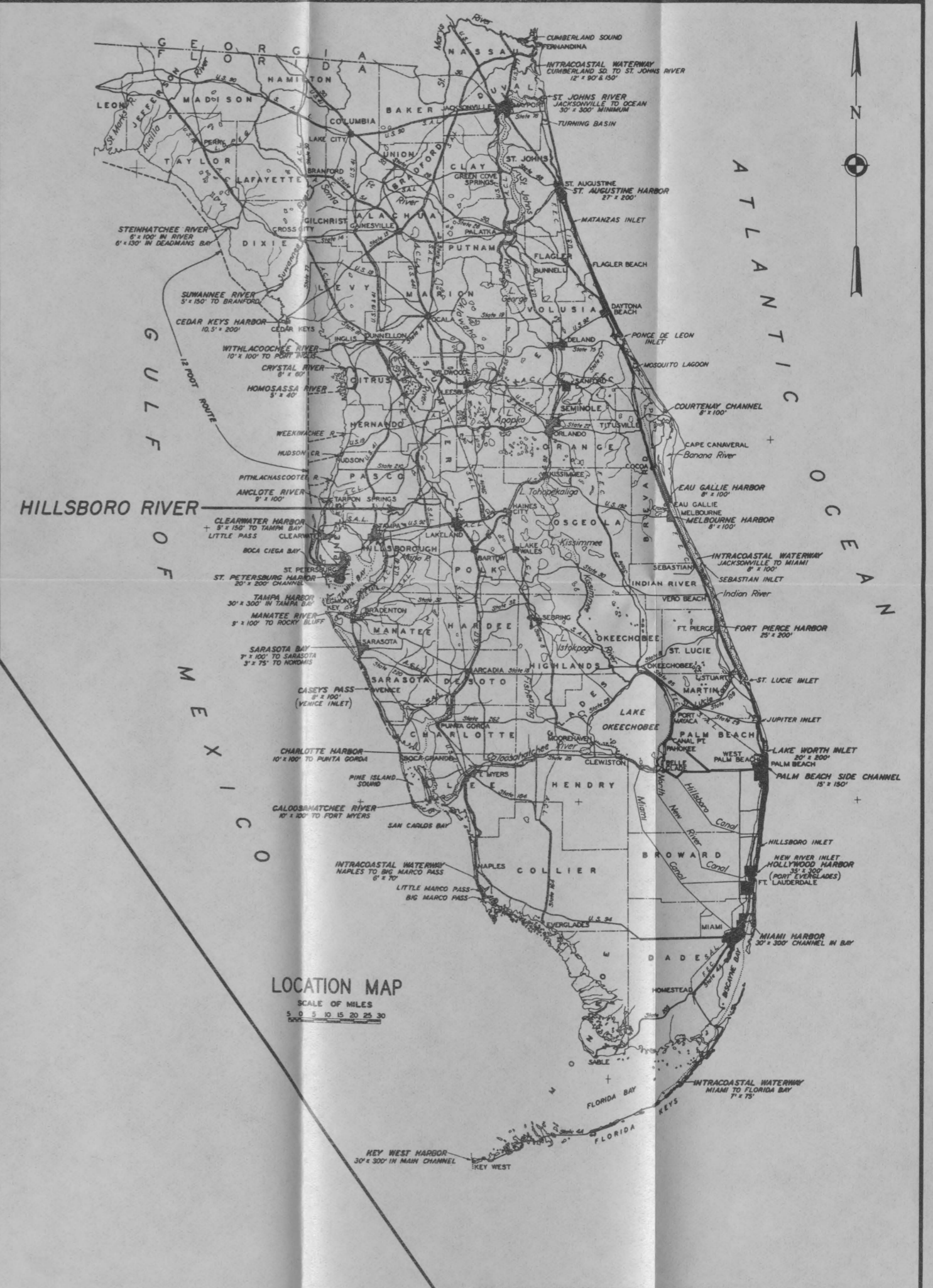
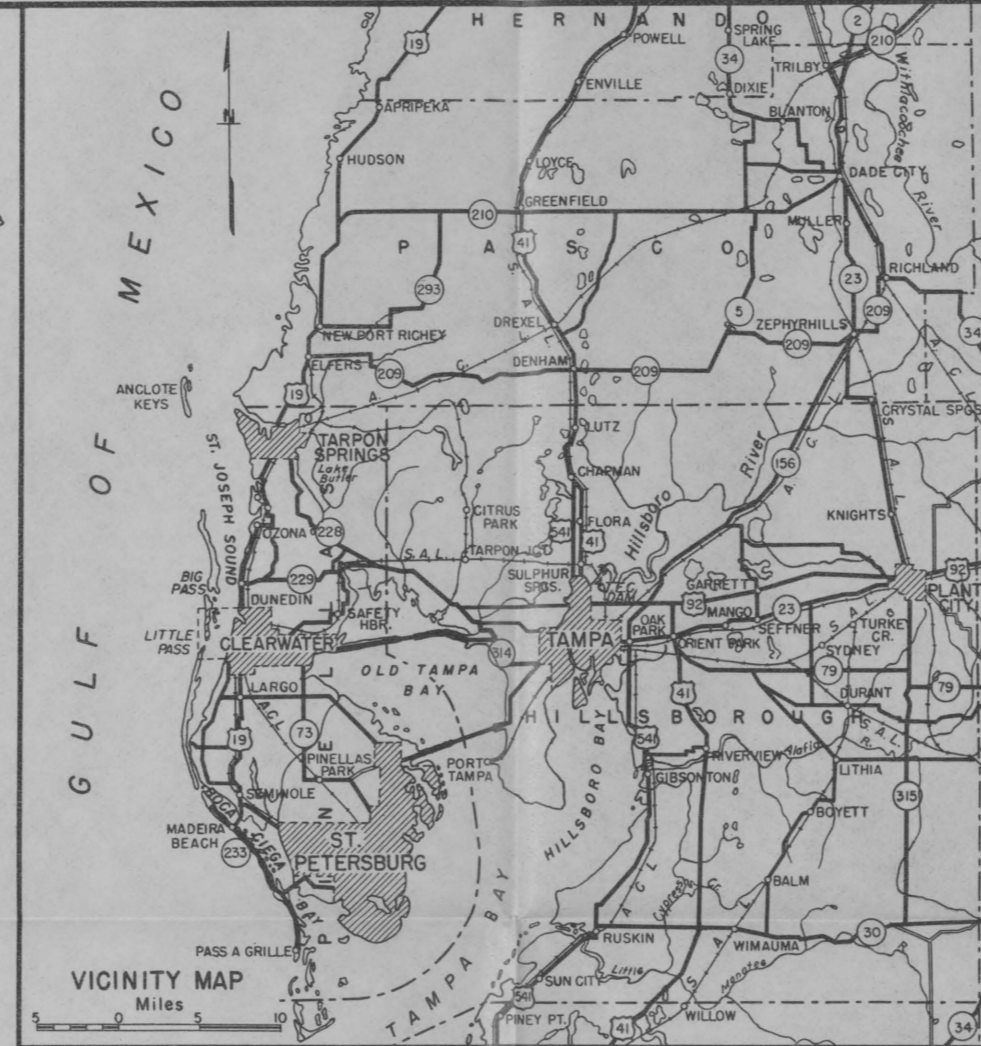
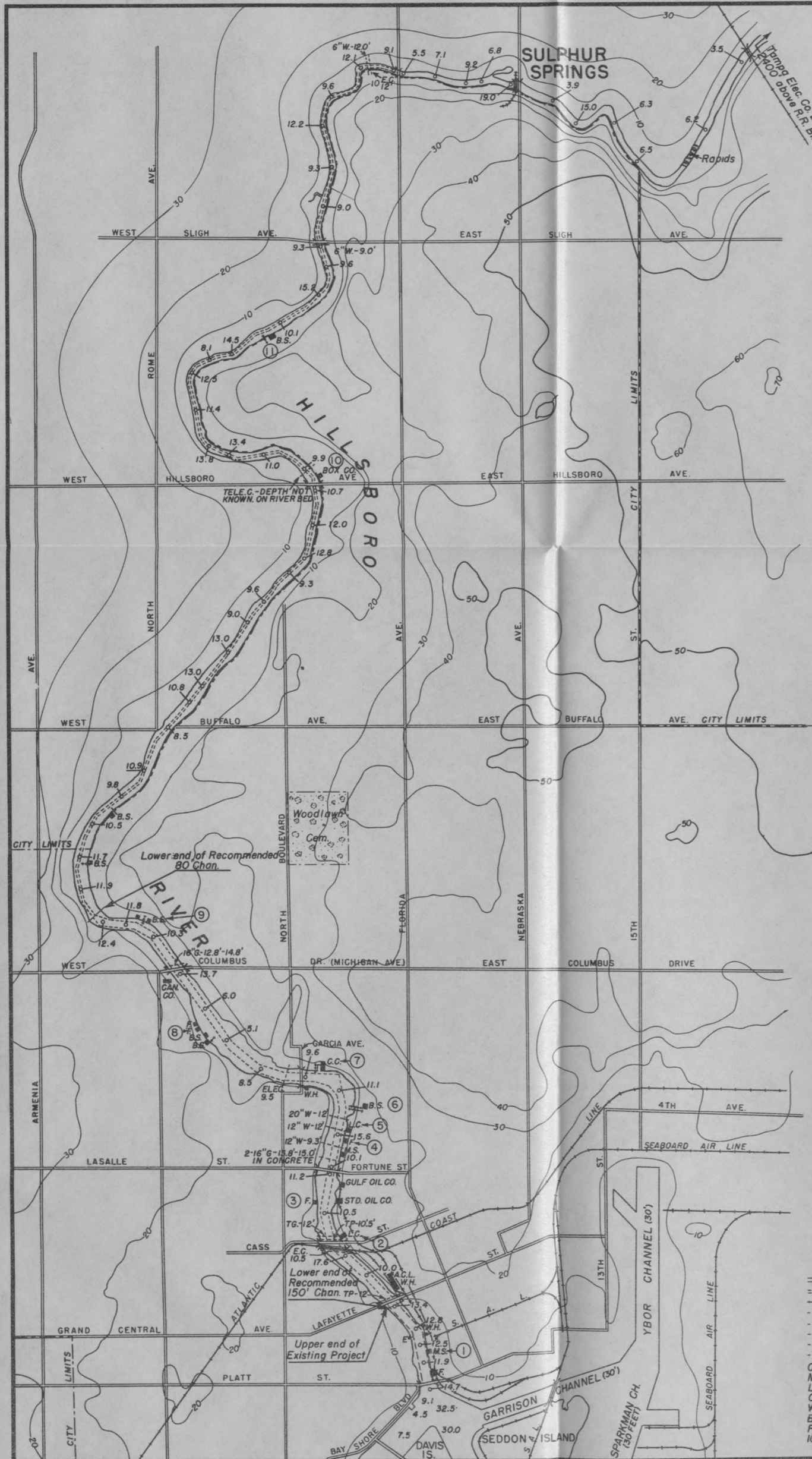
8. The estimate of savings, as revised in this office, is \$4,135, with intangible benefits to pleasure boats. The savings are not commensurate with the cost of the plan proposed by the district engineer.

9. It is believed that a channel 9 feet deep and 100 feet wide to a point 2,000 feet above the Michigan Avenue Bridge and a cleared channel thence to the Florida Avenue Bridge would produce benefits of about \$3,750 annually with substantially the same benefits to pleasure boats as the channel recommended by the district engineer; that the benefits would be commensurate with the cost; and that such a channel would be reasonably adequate for the needs of existing and prospective commerce. The estimated cost of such a channel is \$60,000 with \$1,000 annually for maintenance.

10. I, therefore, recommend that the United States provide a channel 9 feet deep and 100 feet wide from the upper end of the existing project to a point 2,000 feet upstream from the Michigan Avenue Bridge and that snags, wrecks, and piling be removed to the Florida Avenue Bridge at an estimated first cost of \$60,000, with annual maintenance of \$1,000; subject to provisions as stated by the district engineer.

JARVIS J. BAIN,
Colonel, Corps of Engineers,
Division Engineer.

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**SURVEY
HILLSBORO RIVER, FLORIDA
FOR NAVIGATION**

IN 1 SHEET FEET SCALE: 1:30,000
1000 0 1000 2000 3000 4000 5000 6000 7000

U.S. ENGINEER OFFICE, JACKSONVILLE, FLA., MARCH, 1940
SUBMITTED: APPROVAL RECOMMENDED: APPROVED:

W. R. H. *J. A. H.* *W. R. H.*
ASST. ENGINEER PRINCIPAL ENGINEER COLONEL, CORPS OF ENGRS.

DRAWN BY: W.R.H. FILE NO. TO ACCOMPANY REPORT
CHECKED BY: J.A.H. 3-2-12,570 DATED MARCH 7, 1940.